IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application No. 10/775,979

Applicant: ZHU et al.

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DECLARATION UNDER 37 C.F.R. § 1.132 FROM LINFANG ZHU, PH.D.

I, Linfang Zhu, hereby declare that:

1. I obtained a B.S. degree in 1985 in Chemical and Polymer Engineering from Tsinghua University in Bejing, China, and a Ph.D. degree in 1991 in Polymer Science from the University of Akron in Akron, Ohio. I was a post-doctoral research associate at the University of Chicago in Chicago, Illinois, from 1991 to 1992 and at Northern Illinois University, DeKalb, Illinois, from 1993 to 1994. I have been with Videojet Technologies Inc. (or its predecessor) in Wood Dale, Illinois, since 1994, and my present title is Lead Chemist. My areas of expertise include developing ink jet ink compositions.

2. I am a co-inventor of the above-identified application and I am familiar with the application and the pending claims.

3. Claims 2-4, 7-9, 12, 13, 15, and 23-29 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Bhatia et al. (USP 4,567,213) in view of Zou et al. (USP 6,726,756). Based on the experiments conducted under my supervision or direction, it is my opinion that if the styrene-acrylic resin of Bhatia et al. is replaced with the vinyl resin of Zou et al., the resulting ink would be unfit for the intended purpose of Bhatia et al.

4. The following ink compositions were prepared.

Example 1 of Bhatia et al U.S. patent 4,567,213	
Methanol	42.57%
Methyl ethyl ketone	30.70%
Ethyleneglycol methyl ether	8.90%
DI water	1.47%
Methyl ester of rosin (Abalyn D-E)	1.35%
Joncryl 67 (styrene-acrylic resin)	12.95%
Dimethylamine hydrochloride	0.07%
Basic violet 10 dye	0.50%
Basic violet 3 dye	1.50%
Total	100%
Comparative Example 1	
Methanol	42.57%
Methyl ethyl ketone	30.70%
Ethyleneglycol methyl ether	8.90%
DI water	1.47%
Methyl ester of rosin (Abalyn D-E)	1.35%
Vinyl resin (VMCH)	12.95%
Dimethylamine hydrochloride	0.07%
Basic violet 10 dye	0.50%
Basic violet 3 dye	1.50%
Total	100%
Comparative Example 2	
Methanol	10.00%
Methyl ethyl ketone	63.27%
Ethyleneglycol methyl ether	8.90%
DI water	1.47%
Methyl ester of rosin (Abalyn D-E)	1.35%
Vinyl resin (VMCH)	12.95%
Dimethylamine hydrochloride	0.07%
Basic violet 10 dye	0.50%
Basic violet 3 dye	1.50%
Total	100%
Comparative Example 3	
Methanol	10.00%
Methyl ethyl ketone	71.22%
Ethyleneglycol methyl ether	8.90%
DI water	1.47%
Methyl ester of rosin (Abalyn D-E)	1.35%
Vinyl resin (VMCH)	5.00%
Dimethylamine hydrochloride	0.07%
Basic violet 10 dye	0.50%
Basic violet 3 dye	1.50%
Total	100%

Comparative Example 4	
Methanol	13.27%
Methyl ethyl ketone	60.00%
Ethyleneglycol methyl ether	8.90%
DI water	1.47%
Methyl ester of rosin (Abalyn D-E)	1.35%
Vinyl resin VMCH	12.95%
Dimethylamine hydrochloride	0.07%
Basic violet 10 dye	0.50%
Basic violet 3 dye	1.50%
Total	100%
Comparative Example 5	
Methanol	21.22%
Methyl ethyl ketone	60.00%
Ethyleneglycol methyl ether	8.90%
DI water	1.47%
Methyl ester of rosin (Abalyn D-E)	1.35%
Vinyl resin (VMCH)	5.00%
Dimethylamine hydrochloride	0.07%
Basic violet 10 dye	0.50%
Basic violet 3 dye	1.50%
Total	100%

The total amount of the ingredients was rounded off to 100%. The ink composition of Comparative Example 1 could not be prepared because the vinyl resin was not soluble in the liquid carrier. To enable the dissolution of the vinyl resin, the amount of methyl ethyl ketone was increased to 63.27% and the amount of methanol was reduced to 10% in Comparative Example 2. The amount of methyl ethyl ketone was increased to 60% and the amount of methanol was reduced to 13.27% in Comparative Example 4.

As the viscosity of the ink of Comparative Examples 2 and 4 was too high for printing with a thermal printer (23.7 cP and 51.9 cP, respectively), the amount of methyl ethyl ketone was increased to 71.22% and the amount of vinyl resin was reduced to 5% in Comparative Example 3. The amount of methyl ethyl ketone was increased to 60% and the amount of vinyl resin was reduced to 5% in Comparative Example 5.

The amounts of methyl ethyl ketone employed in Comparative Examples 1, 4, and 5 and the amount of methanol employed in all Comparative Examples fell within the range taught by Bhatia et al. col. 3, lines 25-30. The amount of vinyl resin employed in all

Comparative Examples is within the range of styrene-acrylic resin taught by Bhatia et al. (5 to 25%; see claim 1). The viscosity of the ink in Comparative Examples 3 and 5 was 2.36 cP and 2.64 cP, respectively, and fell within the range taught by Bhatia et al. at col. 4, lines 15-20.

5. Messages were jet printed on various substrates using ink jet ink compositions of Example 1, Comparative Example 3, and Comparative Example 5. The adhesion of the printed messages after drying was tested and the results obtained are set forth below.

Adhesion tested 1 minute after printing	Example 1	Comparative Ex. 1	Comparative Ex. 2	Comparative Ex. 3
Ink viscosity	2.15 cP	VMCH is insoluble	23.7 cP	2.36 cP
10 finger rub adhesion- Glass	Pass		viscosity too high	Fail
10 finger rub adhesion- Tin plated steel	Pass			Fail
10 finger rub adhesion- Steel	Pass			Pass
10 finger rub adhesion- Aluminum	Pass			Pass
Scotch tape adhesion-Glass	Pass			Fail
Scotch tape adhesion-Tin plated steel	Pass			Fail
Scotch tape adhesion-Steel	Pass			Fail
Scotch tape adhesion-Aluminum	Pass			Fail

Adhesion tested 1 minute after printing	Comparative Ex. 4	Comparative Ex. 5
Ink viscosity	61.9 cP	2.64 cP
10 finger rub adhesion- Glass	viscosity too high	Fail
10 finger rub adhesion- Tin plated steel		Fail
10 finger rub adhesion- Steel		Pass
10 finger rub adhesion- Aluminum		Pass
Scotch tape adhesion-Glass		Fail
Scotch tape adhesion-Tin plated steel		Fail
Scotch tape adhesion-Steel		Fail
Scotch tape adhesion-Aluminum		Fail

The ink of Comparative Examples 3 and 5 failed to produce a message that adhered to glass or treated metal substrate (tin plated steel). The ink also failed to print an adherent message on untreated metal substrate (steel or aluminum) as tested by the scotch tape adhesion test. Although the ink printed moderately adherent message on untreated steel and aluminum, the intended purpose of Bhatia et al. is to print on treated substrates, not untreated

substrates. Printing on untreated substrates is not within the intended purpose of Bhatia et al. Thus, the "Pass" result on finger rub test with respect to steel and aluminum is not relevant. The foregoing clearly shows that if the styrene-acrylic region of Bhatia et al. is replaced with a vinyl resin, the resulting ink will not serve the intended purpose of Bhatia et al.

6. I hereby declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

9-19-2006
Date

Linfang Zhu
Linfang Zhu, Ph.D.